

Water Quality Assessment the San Miguel River City of Telluride Telluride Regional WWTF

Table of Contents

I. WATER QUALITY ASSESSMENT SUMMARY	1
II. INTRODUCTION	2
III. WATER QUALITY STANDARDS	4
<i>Narrative Standards</i>	4
<i>Standards for Organic Parameters and Radionuclides</i>	4
<i>Salinity</i>	5
<i>Temperature</i>	6
<i>Segment Specific Numeric Standard</i>	6
<i>Table Value Standards and Hardness Calculations</i>	8
<i>Total Maximum Daily Loads and Regulation 93 – Colorado’s Section 303(d) List of Impaired Waters and Monitoring and Evaluation List</i>	9
IV. RECEIVING STREAM INFORMATION	10
<i>Low Flow Analysis</i>	10
<i>Mixing Zones</i>	11
<i>Ambient Water Quality</i>	11
V. FACILITY INFORMATION AND POLLUTANTS EVALUATED	12
<i>Facility Information</i>	12
<i>Pollutants of Concern</i>	13
VI. DETERMINATION OF WATER QUALITY BASED EFFLUENT LIMITATIONS (WQBELS)	14
<i>Technical Information</i>	14
<i>Calculation of WQBELs</i>	15
VII. ANTIDEGRADATION EVALUATION	18
<i>Introduction to the Antidegradation Process</i>	19
<i>Significance Tests for Temporary Impacts and Dilution</i>	19
<i>New or Increased Impact and Non Impact Limitations (NILs)</i>	19
<i>Calculation of Loadings for New or Increased Impact Test</i>	21
<i>Calculation of Non-Impact Limitations</i>	21
<i>Determination of Baseline Water Quality (BWQ)</i>	23
<i>Bioaccumulative Significance Test</i>	24
<i>Significant Concentration Threshold</i>	24
<i>Determination of the Antidegradation Based Average Concentrations</i>	25
<i>Concentration Significance Tests</i>	27
<i>Antidegradation Based Effluent Limitations (ADBELs)</i>	28
<i>Alternatives Analysis</i>	30
VIII. TECHNOLOGY BASED LIMITATIONS	30
<i>Federal Effluent Limitation Guidelines</i>	30
<i>Regulations for Effluent Limitations</i>	30
IX. REFERENCES	31

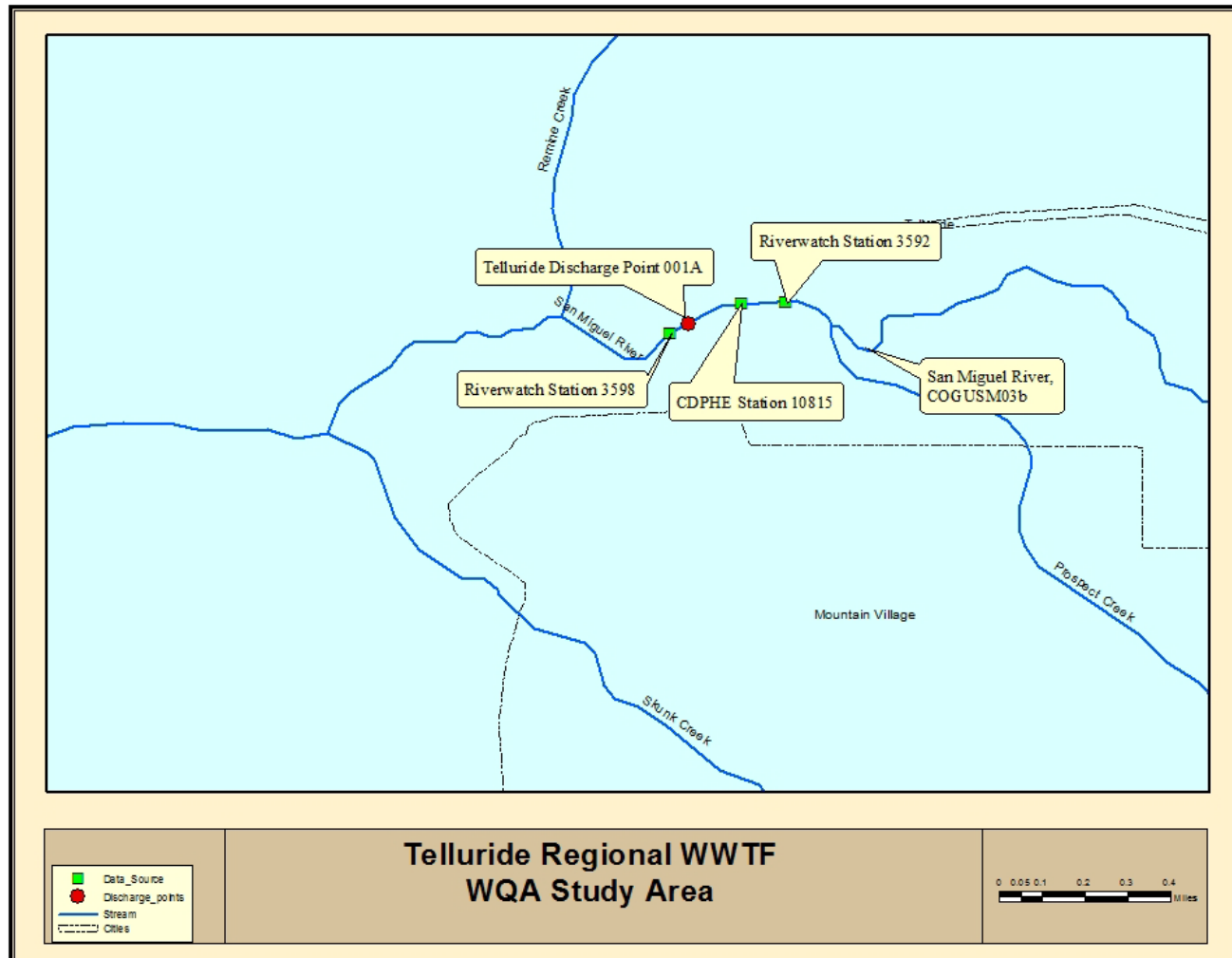
I. Water Quality Assessment Summary

Table A-1 includes summary information related to this WQA. This summary table includes key regulatory starting points used in development of the WQA such as: receiving stream information; threatened and endangered species; 303(d) and Monitoring and Evaluation listings; low flow and facility flow summaries; and a list of parameters evaluated.

Table A-1 WQA Summary					
Facility Information					
Facility Name		Permit Number		Design Flow (max 30-day ave, MGD)	Design Flow (max 30-day ave, CFS)
Telluride Regional		CO0041840		2.1	3.2
Receiving Stream Information					
Receiving Stream Name	Segment ID	Designation	Classification(s)		
San Miguel River	COGUSM03b	Undesignated	Aquatic Life Cold 1 Recreation Class E Agriculture Water Supply		
Low Flows (cfs)					
1E3 (1-day)	7E3 (7-day)	30E3 (30-day)	Ratio of 30E3 to the Design Flow (cfs)		
7.98	8.4	8.9	2.8		
Regulatory Information					
T&E Species	303(d) (Reg 93)	Monitor and Eval (Reg 93)	Existing TMDL	Temporary Modification(s)	Control Regulation
No	None	Lead	No	None	Regulation 39
Pollutants Evaluated					
Ammonia, E. Coli, TRC, Metals, Temp					

II. Introduction

The water quality assessment (WQA) of the San Miguel River near the Telluride Regional Wastewater Treatment Facility (WWTF), located in San Miguel County, is intended to determine the assimilative capacities available for pollutants found to be of concern. This WQA describes how the water quality based effluent limits (WQBELs) are developed. These parameters may or may not appear in the permit with limitations or monitoring requirements, subject to other determinations such as reasonable potential analysis, evaluation of federal effluent limitation guidelines, implementation of state-based technology based limits, mixing zone analyses, 303(d) listings, threatened and endangered species listing, or other requirements as discussed in the permit rationale. Figure A-1 contains a map of the study area evaluated as part of this WQA.

FIGURE A-1

The Telluride Regional WWTF discharges to the San Miguel River, which is stream segment COGUSM03b. This means the Gunnison River Basin, San Miguel Sub-basin, Stream Segment 03b. This segment is composed of the “Mainstem of the San Miguel River from a point immediately above the confluence of Marshall Creek to a point immediately above the confluence of the South Fork San Miguel River.” Stream segment COGUSM03b is classified for Aquatic Life Cold 1, Recreation Class E, Water Supply and Agriculture.

Information used in this assessment includes data gathered from the Telluride Regional WWTF, the Division, the Colorado Division of Water Resources (DWR), Riverwatch and, the U.S. Environmental Protection Agency (EPA). The data used in the assessment consist of the best information available at the time of preparation of this WQA analysis.

III. Water Quality Standards

Narrative Standards

Narrative Statewide Basic Standards have been developed in Section 31.11(1) of the regulations, and apply to any pollutant of concern, even where there is no numeric standard for that pollutant. Waters of the state shall be free from substances attributable to human-caused point source or nonpoint source discharges in amounts, concentrations or combinations which:

for all surface waters except wetlands;

(i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludge, mine slurry or tailings, silt, or mud; or (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or (v) produce a predominance of undesirable aquatic life; or (vi) cause a film on the surface or produce a deposit on shorelines; and

for surface waters in wetlands;

(i) produce color, odor, changes in pH, or other conditions in such a degree as to create a nuisance or harm water quality dependent functions or impart any undesirable taste to significant edible aquatic species of the wetland; or (ii) are toxic to humans, animals, plants, or aquatic life of the wetland.

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for any parameter of concern could be put in CDPS discharge permits.

Standards for Organic Parameters and Radionuclides

Radionuclides: Statewide Basic Standards have been developed in Section 31.11(2) and (3) of The Basic Standards and Methodologies for Surface Water to protect the waters of the state from radionuclides and organic chemicals.

In no case shall radioactive materials in surface waters be increased by any cause attributable to municipal, industrial, or agricultural practices or discharges to as to exceed the following levels, unless alternative site-specific standards have been adopted. Standards for radionuclides are shown in Table A-2.

Table A-2 Radionuclide Standards	
Parameter	Picocuries per Liter
Americium 241*	0.15
Cesium 134	80
Plutonium 239, and 240*	0.15
Radium 226 and 228*	5
Strontium 90*	8
Thorium 230 and 232*	60
Tritium	20,000

*Radionuclide samples for these materials should be analyzed using unfiltered (total) samples. These Human Health based standards are 30-day average values for both plutonium and americium.

Organics: The organic pollutant standards contained in the Basic Standards for Organic Chemicals Table are applicable to all surface waters of the state for the corresponding use classifications, unless alternative site-specific standards have been adopted. These standards have been adopted as “interim standards” and will remain in effect until alternative permanent standards are adopted by the Commission. These interim standards shall not be considered final or permanent standards subject to antibacksliding or downgrading restrictions. Although not reproduced in this WQA, the specific standards for organic chemicals can be found in Regulation 31.11(3).

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for radionuclides, organics, or any other parameter of concern could be put in CDPS discharge permits.

The aquatic life standards for organics apply to all stream segments that are classified for aquatic life. The water supply standards apply only to those segments that are classified for water supply. The water + fish standards apply to those segments that have a Class 1 aquatic life and a water supply classification. The fish ingestion standards apply to Class 1 aquatic life segments that do not have a water supply designation. The water + fish and the fish ingestion standards may also apply to Class 2 aquatic life segments, where the Water Quality Control Commission has made such determination.

Because the the San Miguel River is classified for Aquatic Life Cold 1, with a water supply designation, the water supply, water + fish, and aquatic life standards apply to this discharge.

Salinity

Salinity: Regulation 61.8(2)(l) contains requirements regarding salinity for any discharges to the Colorado River Watershed. For industrial dischargers and for the discharge of intercepted groundwater, this is a no-salt discharge requirement. However, the regulation states that this requirement may be waived where the salt load reaching the mainstem of the Colorado River is less than 1 ton per day, or less than 350 tons per year. The Division may permit the discharge of salt upon a satisfactory demonstration that it is not practicable to prevent the discharge of all salt. See

Regulation 61.8(2)(l)(i)(A)(1) for industrial discharges and 61.8(2)(l)(iii) for discharges of intercepted groundwater for more information regarding this demonstration.

For municipal dischargers, an incremental increase of 400 mg/l above the flow weighted averaged salinity of the intake water supply is allowed. This may be waived where the salt load reaching the mainstem of the Colorado River is less than 1 ton per day, or less than 366 tons per year. The Division may permit the discharge of salt in excess of the 400 mg/l incremental increase, upon a satisfactory demonstration that it is not practicable to attain this limit. See Regulation 61.8(2)(l)(vi)(A)(1) for more information regarding this demonstration.

Regulation 75 contains requirements for the release of water from Cheraw Lake. Any entity releasing water from Cheraw Lake must ensure that either: 1) the water has a TDS concentration less than or equal to 4300 mg/l, or 2) that an adequate quantity of water of less saline nature can be supplied for dilution purposes such that a salinity level of 4300 ppm, measured as TDS, can be maintained in Horse Creek immediately above the first diversion below the confluence with the Cheraw Lake outlet channel.

In addition, the Division's policy, Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, may be applied to discharges where an agricultural water intake exists downstream of a discharge point. Limitations for electrical conductivity and sodium absorption ratio may be applied in accordance with this policy.

Temperature

Temperature shall maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deemed deleterious to the resident aquatic life. This standard shall not be interpreted or applied in a manner inconsistent with section 25-8-104, C.R.S.

Segment Specific Numeric Standards

Numeric standards are developed on a basin-specific basis and are adopted for particular stream segments by the Water Quality Control Commission. The standards in Table A-3a have been assigned to stream segment COGUSM03b in accordance with the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins*. Additionally, the parameters in Table A-3b are also being evaluated as they are parameters of concern for this facility type. These parameters are being included based on the numeric standards in Regulation 31.

Table A-3a In-stream Standards for Stream Segment COGUSM03b	
<i>Physical and Biological</i>	
Dissolved Oxygen (DO) = 6 mg/l, minimum (7 mg/l, minimum during spawning)	
pH = 6.5 - 9 su	
E. coli chronic = 126 colonies/100 ml	
April-May T(DM)=14.0 °C T(MWAT)=9.0 °C June-Sept T(DM)=21.7 °C T(MWAT)=17.0 °C Oct T(DM)=13.9 °C T(MWAT)=9.0 °C Nov-March T(DM)=13.0 °C T(MWAT)=9.0 °C	
<i>Inorganic</i>	
Total Ammonia acute and chronic = TVS	
Chlorine acute = 0.019 mg/l	
Chlorine chronic = 0.011 mg/l	
Free Cyanide acute = 0.005 mg/l	
Sulfide chronic = 0.002 mg/l	
Boron chronic = 0.75 mg/l	
Nitrite acute = 0.05 mg/l	
Nitrate acute = 10 mg/l	
Chloride chronic = 250 mg/l	
Sulfate chronic = For WS, the greater of ambient water quality as of January 1, 2000 or 250 mg/l	
<i>Metals</i>	
Dissolved Arsenic acute = 340 µg/l	
Total Recoverable Arsenic chronic = 0.02 µg/l	
Dissolved Cadmium acute for trout and Dissolved Cadmium chronic = TVS	
Total Recoverable Trivalent Chromium acute = 50 µg/l	
Dissolved Trivalent Chromium chronic = TVS	
Dissolved Hexavalent Chromium acute and chronic = TVS	
Dissolved Copper acute and chronic = TVS	
Dissolved Iron chronic = For WS, the greater of ambient water quality as of January 1, 2000, or 300 µg/l	
Total Recoverable Iron chronic = 1000 µg/l	
Dissolved Lead acute and chronic = TVS	
Dissolved Manganese chronic = For WS, the greater of ambient water quality as of January 1, 2000, or 50 µg/l	
Dissolved Manganese acute and chronic = TVS	
Total Recoverable Molybdenum chronic = 160 µg/l	
Total Mercury chronic = 0.01 µg/l	
Dissolved Nickel acute and chronic = TVS	
Dissolved Selenium acute and chronic = TVS	
Dissolved Silver acute and Dissolved Silver chronic for trout = TVS	
Dissolved Zinc acute = TVS Zinc chronic = 190 µg/l	

Table A-3b
Additional Standards Being Evaluated Based on Regulation 31
<i>Additional Parameters Being Considered in This WQA, Based on Regulation 31</i>
Nonylphenol acute = 28 µg/l
Nonylphenol chronic = 6.6 µg/l
Total Recoverable Aluminum acute and chronic = TVS

Table Value Standards and Hardness Calculations

Standards for metals are generally shown in the regulations as Table Value Standards (TVS), and these often must be derived from equations that depend on the receiving stream hardness or species of fish present; for ammonia, standards are discussed further in Section IV of this WQA. The Classification and Numeric Standards documents for each basin include a specification for appropriate hardness values to be used. Specifically, the regulations state that:

The hardness values used in calculating the appropriate metal standard should be based on the lower 95% confidence limit of the mean hardness value at the periodic low flow criteria as determined from a regression analysis of site-specific data. Where insufficient site-specific data exists to define the mean hardness value at the periodic low flow criteria, representative regional data shall be used to perform the regression analysis. Where a regression analysis is not appropriate, a site-specific method should be used.

The mean hardness was computed to be 145 mg/l based on sampling data from Riverwatch Station 3598 (Below WWTF) located on the San Miguel River 0.1 mile downstream from the Telluride Regional. Data from February 2007 through October 2010 were used. This hardness value and the formulas contained in the TVS were used to calculate the in-stream water quality standards for metals, with the results shown in Table A-4.

Table A-4 TVS-Based Metals Water Quality Standards for CO0041840 Based on the Table Value Standards Contained in the Colorado Department of Public Health and Environment Water Quality Control Commission <i>Regulation 35</i>			
<i>Parameter</i>	<i>In-Stream Water Quality Standard</i>		<i>TVS Formula:</i> <i>Hardness (mg/l) as CaCO₃ =</i> 145
Aluminum, Total Recoverable	Acute	5690 µg/l	$e^{(1.3695(\ln(\text{hardness}))+1.8308)}$
	Chronic	812 µg/l	$e^{(1.3695(\ln(\text{hardness}))-0.1158)}$
Cadmium, Dissolved	Acute	2.4 µg/l	$[1.136672-0.041838\ln(\text{hardness})]e^{(0.9151(\ln(\text{hardness}))-3.6236)}$
	Chronic	0.56 µg/l	$[1.101672-0.041838\ln(\text{hardness})]e^{(0.7998(\ln(\text{hardness}))-4.4451)}$
Trivalent Chromium, Dissolved	Chronic	100 µg/l	$e^{(0.819(\ln(\text{hardness}))+0.5340)}$
Hexavalent Chromium, Dissolved	Acute	16 µg/l	Numeric standards provided, formula not applicable
	Chronic	11 µg/l	Numeric standards provided, formula not applicable
Copper, Dissolved	Acute	19 µg/l	$e^{(0.9422(\ln(\text{hardness}))-1.7408)}$
	Chronic	12 µg/l	$e^{(0.8545(\ln(\text{hardness}))-1.7428)}$
Lead, Dissolved	Acute	97 µg/l	$[1.46203-0.145712\ln(\text{hardness})][e^{(1.273(\ln(\text{hardness}))-1.46)}]$
	Chronic	3.8 µg/l	$[1.46203-0.145712\ln(\text{hardness})][e^{(1.273(\ln(\text{hardness}))-4.705)}]$
Manganese, Dissolved	Acute	3379 µg/l	$e^{(0.3331(\ln(\text{hardness}))+6.4676)}$
Nickel, Dissolved	Acute	641 µg/l	$e^{(0.846(\ln(\text{hardness}))+2.253)}$
	Chronic	71 µg/l	$e^{(0.846(\ln(\text{hardness}))+0.0554)}$
Selenium, Dissolved	Acute	18.4 µg/l	Numeric standards provided, formula not applicable
	Chronic	4.6 µg/l	Numeric standards provided, formula not applicable
Silver, Dissolved	Acute	3.8 µg/l	$\frac{1}{2} e^{(1.72(\ln(\text{hardness}))-6.52)}$
	Chronic	0.14 µg/l	$e^{(1.72(\ln(\text{hardness}))-10.51)}$
Zinc, Dissolved	Acute	197 µg/l	$0.978e^{(0.8525(\ln(\text{hardness}))+1.0617)}$
	Chronic	171 µg/l	$0.986 e^{(0.8525(\ln(\text{hardness}))+0.9109)}$

Total Maximum Daily Loads and Regulation 93 – Colorado’s Section 303(d) List of Impaired Waters and Monitoring and Evaluation List

This stream segment is listed for monitoring and evaluation for lead. According to Division standard procedure, the Division’s Environmental Data Unit investigates issues of water quality standard exceedances. If it is determined that the water body is impaired, the segment will be added to the 303(d) list. At a minimum, the permit may contain monitoring requirements to support a future TMDL if the segment is listed.

IV. Receiving Stream Information

Low Flow Analysis

The Colorado Regulations specify the use of low flow conditions when establishing water quality based effluent limitations, specifically the acute and chronic low flows. The acute low flow, referred to as 1E3, represents the one-day low flow recurring in a three-year interval, and is used in developing limitations based on an acute standard. The 7-day average low flow, 7E3, represents the seven-day average low flow recurring in a 3 year interval, and is used in developing limitations based on a Maximum Weekly Average Temperature standard (MWAT). The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval, and is used in developing limitations based on a chronic standard.

To determine the low flows available to the Telluride Regional WWTF, the City of Telluride gage station, Mahoney Gage, was used. Telluride's flow gage provides a representative measurement of upstream flow because it is located approximately two (2) miles upstream of the Telluride Regional WWTF.

Near weekly flows from the city of Telluride Mahoney Gage Station were obtained and the annual 1E3 and 30E3 low flows were calculated using U.S. Environmental Protection Agency (EPA) DFLOW software. Since the DFLOW model was not able to process data the Division manually calculated low flows for 30-day chronic and 1-day acute monthly flows. An average of these monthly flows was calculated to represent 7-day low flows. Calculated low flows were similar to those calculated by DFLOW model previously, except for some summer months and therefore used in this WQA.

Flow data from 2001 through 2012 were available from the gage station. The gage station and time frames were deemed the most accurate and representative of current flows and were therefore used in this analysis.

Based on the low flow analysis described previously, the upstream low flows available to the Telluride Regional WWTF were calculated and are presented in Table A-5.

Table A-5													
Low Flows for the San Miguel River at the Telluride Regional WWTF													
<i>Low Flow (cfs)</i>	<i>Annual</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
1E3 Acute	8.0	8.0	8.2	9.3	13.0	29.0	21.0	19.0	14.0	15.0	11.0	9.6	8.2
7E3 Chronic	8.4	8.4	8.6	11.0	20.0	38.0	53.0	27.0	17.0	16.0	13.0	11.0	8.9
30E3 Chronic	8.9	8.9	9.1	12.0	26.0	47.0	86.0	35.0	20.0	17.0	14.0	11.0	9.6

The ratio of the low flow of the San Miguel River to the Telluride Regional WWTF design flow is 2.8:1.

Mixing Zones

The amount of the available assimilative capacity (dilution) that may be used by the permittee for the purposes of calculating the WQBELs may be limited in a permitting action based upon a mixing zone analysis or other factor. These other factors that may reduce the amount of assimilative capacity available in a permit are: presence of other dischargers in the vicinity; the presence of a water diversion downstream of the discharge (in the mixing zone); the need to provide a zone of passage for aquatic life; the likelihood of bioaccumulation of toxins in fish or wildlife; habitat considerations such as fish spawning or nursery areas; the presence of threatened and endangered species; potential for human exposure through drinking water or recreation; the possibility that aquatic life will be attracted to the effluent plume; the potential for adverse effects on groundwater; and the toxicity or persistence of the substance discharged.

Unless a facility has performed a mixing zone study during the course of the previous permit, and a decision has been made regarding the amount of the assimilative capacity that can be used by the facility, the Division assumes that the full assimilative capacity can be allocated. Note that the review of mixing study considerations, exemptions and perhaps performing a new mixing study (due to changes in low flow, change in facility design flow, channel geomorphology or other reason) is evaluated in every permit and permit renewal.

If a mixing zone study has been performed and a decision regarding the amount of available assimilative capacity has been made, the Division may calculate the water quality based effluent limitations (WQBELs) based on this available capacity. In addition, the amount of assimilative capacity may be reduced by T&E implications.

For this facility, 100% of the available assimilative capacity may be used as the facility has not had to perform a mixing zone study, and the discharge is not to a T&E stream segment, and is not expected to have an influence on any of the other factors listed above.

Ambient Water Quality

The Division evaluates ambient water quality based on a variety of statistical methods as prescribed in Section 31.8(2)(a)(i) and 31.8(2)(b)(i)(B) of the *Colorado Department of Public Health and Environment Water Quality Control Commission Regulation No. 31*, and as outlined in the Division's Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits (WQP-19). Ambient water quality is evaluated in this WQA analysis for use in determining assimilative capacities and in completing antidegradation reviews for pollutants of concern, where applicable.

To conduct an assessment of the ambient water quality upstream of the Telluride Regional WWTF, data were gathered primarily from Division Station 10815 (San Miguel at Society Turn) located immediate upstream from the facility. Data were available for a period of record from April 2005 through September 2010. Riverwatch Station 3592 (Society Turn) was also used for Dissolved

Arsenic (data from October 2004 through October 2009). Data from these sources were used to reflect upstream water quality. These data are summarized in Table A-6.

Table A-6 Ambient Water Quality for the San Miguel River								
<i>Parameter</i>	<i>Number of Samples</i>	<i>15th Percentile</i>	<i>50th Percentile</i>	<i>85th Percentile</i>	<i>Mean</i>	<i>Maximum</i>	<i>Chronic Stream Standard</i>	<i>Notes</i>
Temp (°C)	18	4.4	8.6	13	8.7	15	NA	
DO (mg/l)	18	8.1	8.6	9.9	8.8	11	7	
pH (su)	17	7.8	7.9	8	7.9	8.2	6.5-9	
<i>E. coli</i> (#/100 ml)	17	1	2	15	3	22	126	1, 2
NH ₃ as N, Tot (mg/l)	18	0	0	0.034	0.0099	0.04	TVS	2
Al, Dis (µg/l)	11	0	0	0	8.3	91	NA	2
As, Dis (µg/l)	39	0	0	6.6	11	118	340	2
Cd, Dis (µg/l)	21	0	0	0.7	0.22	0.9	0.56	2, 3
Cu, Dis (µg/l)	21	0	0	0	0.29	6	12	2
Fe, Dis (µg/l)	21	40	67	87	63	110	300	
Fe, TR (µg/l)	21	120	170	320	353	2900	1000	
Pb, Dis (µg/l)	21	0	0	0	0.14	2	3.80	2
Mn, Dis (µg/l)	21	41	84	120	92	170	156*	
Se, Dis (µg/l)	21	0	0	0	0.15	2.1	4.6	2
Ag, Dis (µg/l)	19	0	0	0	0.024	0.45	0.14	2
Zn, Dis (µg/l)	21	93	150	200	141	240	190	3
Sulfate (mg/l)	18	40	68	84	64	88	250	
Hardness as CaCO ₃ (mg/l)	43	104	160	176	145	190	NA	
Note 1: The calculated mean is the geometric mean. Note that for summarization purposes, the value of one was used where there was no detectable amount because the geometric mean cannot be calculated using a value equal to zero.								
Note 2: When sample results were below detection levels, the value of zero was used in accordance with the Division's standard approach for summarization and averaging purposes.								
Note 3: The ambient water quality exceeds the water quality standards for these parameters.								

*based on CDPHE station 10815, data is the 85th percentile of data from 3/2010 through 12/2000. 85th percentile of Fe, Dis was 47 µg/l and therefore 300 µg/l has been applied.

V. Facility Information and Pollutants Evaluated

Facility Information

The Telluride Regional WWTF is located at in the SW 1/4 of the NW 1/4 of S33, T24N; 12000 Nwy 145, Telluride CO; at 37.94866° latitude North and 107.87366° longitude West in San Miguel County. The current design capacity of the facility is 2.1 MGD (3.2 cfs). Wastewater treatment is accomplished using a mechanical wastewater treatment process. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

An assessment of Division records indicates that there is a minor wastewater treatment facility (Last Dollar PUD, COG588005) about 0.9 mile downstream from the Telluride Regional WWTF. This facility has a design flow of 0.0003 MGD.

Also, Telecam Partnership II Limited Lawson Hill PUD Illium Valley WWTF (COG589021) is located about 3.5 mile downstream from the facility. This is also a minor WWTF with a design flow of 0.01 MGD.

Therefore, only facility to potentially be modeled together with Telluride Regional WWTF is Last Dollar PUD. However, it is too small to have any impact on the limitation calculations for E.coli, TRC and ammonia. Therefore, the Division did not model this facility with any other facility.

Pollutants of Concern

Pollutants of concern may be determined by one or more of the following: facility type; effluent characteristics and chemistry; effluent water quality data; receiving water quality; presence of federal effluent limitation guidelines; or other information. Parameters evaluated in this WQA may or may not appear in a permit with limitations or monitoring requirements, subject to other determinations such as a reasonable potential analysis, mixing zone analyses, 303(d) listings, threatened and endangered species listings or other requirement as discussed in a permit rationale.

There are no site-specific in-stream water quality standards for BOD₅ or CBOD₅, TSS, percent removal, and oil and grease for this receiving stream. Thus, assimilative capacities were not determined for these parameters. The applicable limitations for these pollutants can be found in Regulation No. 62 and will be applied in the permit for the WWTF.

The following parameters were identified by the Division as pollutants to be evaluated for this facility:

- Total Residual Chlorine
- *E. coli*
- Nitrate
- Ammonia
- Temperature
- Metals and Cyanide

It is the Division's standard procedure to consider metals and cyanide as potential pollutants of concern for all major domestic WWTFs.

According to the *Rationale for Classifications, Standards and Designations of the Gunnison River*, stream segment COGUSM03b is designated a water supply because "are several private and municipal alluvial wells in this segment (Table 8)." Thus, the nitrate standard, which is applied at the point of intake to a water supply, is further evaluated as part of this WQA.

During assessment of the facility, nearby facilities, and receiving stream water quality, no additional parameters were identified as pollutants of concern.

VI. Determination of Water Quality Based Effluent Limitations (WQBELs)

Technical Information

Note that the WQBELs developed in the following paragraphs, are calculations of what an effluent limitation may be in a permit. The WQBELs for any given parameter, will be compared to other potential limitations (federal effluent limitations guidelines, state effluent limitations, or other applicable limitation) and typically the more stringent limit is incorporated into a permit. If the WQBEL is the more stringent limitation, incorporation into a permit is dependent upon a reasonable potential analysis.

In-stream background data and low flows evaluated in Sections II and III are used to determine the assimilative capacity of the San Miguel River near the Telluride Regional WWTF for pollutants of concern, and to calculate the WQBELs. For all parameters except ammonia, it is the Division's approach to calculate the WQBELs using the lowest of the monthly low flows (referred to as the annual low flow) as determined in the low flow analysis. For ammonia, it is the standard procedure of the Division to determine monthly WQBELs using the monthly low flows, as the regulations allow the use of seasonal flows.

The Division's standard analysis consists of steady-state, mass-balance calculations for most pollutants and modeling for pollutants such as ammonia. The mass-balance equation is used by the Division to calculate the WQBELs, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation is expressed as:

$$M_2 = \frac{M_3Q_3 - M_1Q_1}{Q_2}$$

Where,

Q_1 = Upstream low flow (1E3 or 30E3)

Q_2 = Average daily effluent flow (design capacity)

Q_3 = Downstream flow ($Q_1 + Q_2$)

M_1 = In-stream background pollutant concentrations at the existing quality

M_2 = Calculated WQBEL

M_3 = Water Quality Standard, or other maximum allowable pollutant concentration

The upstream background pollutant concentrations used in the mass-balance equation will vary based on the regulatory definition of existing ambient water quality. For most pollutants, existing quality is determined to be the 85th percentile. For metals in the total or total recoverable form, existing quality is determined to be the 50th percentile. For pathogens such as fecal coliform and *E. coli*, existing quality is determined to be the geometric mean.

For temperature, the highest 7-day mean (for the chronic standard) of daily average stream temperature, over a seven consecutive day period will be used in calculations of the chronic temperature assimilative capacity, where the daily average temperature should be calculated from a minimum of three measurements spaced equally through the day. The highest 2-hour mean (for the

acute standard) of stream temperature will be used in calculations of the acute temperature assimilative capacity. The highest 2-hour mean should be calculated from a minimum of 12 measurements spaced equally through the day.

Calculation of WQBELs

Using the mass-balance equation provided in the beginning of Section VI, the acute and chronic low flows set out in Section IV, ambient water quality as discussed in Section IV, and the in-stream standards shown in Section III, the WQBELs for were calculated. The data used and the resulting WQBELs, M_2 , are set forth in Table A-7a for the chronic WQBELs and A-7b for the acute WQBELs.

Where a WQBEL is calculated to be a negative number and interpreted to be zero and/or when the ambient water quality exceeds the in-stream standard, the Division standard procedure is to allocate the water quality standard to prevent further degradation of the receiving waters.

Chlorine: There are no point sources discharging total residual chlorine within one mile of the Telluride Regional WWTF. Because chlorine is rapidly oxidized, in-stream levels of residual chlorine are detected only for a short distance below a source. Ambient chlorine was therefore assumed to be zero.

***E. coli*:** There are no point sources discharging *E. coli* within one mile of the Telluride Regional WWTF. Thus, WQBELs were evaluated separately. For *E. coli*, the Division establishes the 7-day geometric mean limit as two times the 30-day geometric mean limit and also includes maximum limits of 2,000 colonies per 100 ml (30-day geometric mean) and 4,000 colonies per 100 ml (7-day geometric mean). This 2000 colony limitation also applies to discharges to ditches.

Temperature:

A WQBEL for temperature can only be calculated if there is representative data, in the proper form, to determine what the background Maximum Weekly Average Temperature and Daily Maximum ambient temperatures are. As this data is not available at this time, the temperature limitation will be set at the water quality standard and will be revisited in the future when representative temperature data becomes available.

Nitrate / Total Inorganic Nitrogen (T.I.N.): An acute nitrate standard of 10 mg/l is assigned to this segment, and is intended to be applied at the nearest downstream water intake, which is located almost immediately downstream (about 0.9 mile) from the Telluride Regional WWTF. Because nitrite and ammonia can also form nitrate, compliance with the nitrate standard is achieved through imposition of a Total Inorganic Nitrogen (T.I.N.) limit. T.I.N. effectively measures nitrate and its precursors including nitrite and ammonia.

It should be noted that although the in-stream low flow may increase significantly downstream from the Telluride Regional WWTF, there was no need to evaluate the downstream flows because the first water intake is only less than a mile downstream from the discharge.

Table A-7a Chronic WQBELs							
<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>M₃</i>	<i>M₂</i>	<i>Notes</i>
Temp MWAT (°C) June-Sept	8.9	3.2	12.1	NA	17	17	
Temp MWAT (°C) Oct-May	8.9	3.2	12.1	NA	9	9	
E. coli (#/100 ml)	8.9	3.2	12.1	3	126	468	
TRC (mg/l)	8.9	3.2	12.1	0	0.011	0.042	
Al, TR (µg/l)	8.9	3.2	12.1	0	812	3070	
As, TR (µg/l)	8.9	3.2	12.1	0	0.02	0.076	
Cd, Dis (µg/l)	8.9	3.2	12.1	0.7	0.56	0.56	1
Cr+3, Dis (µg/l)	8.9	3.2	12.1	0	100	378	
Cr+6, Dis (µg/l)	8.9	3.2	12.1	0	11	42	
Fe, Dis (µg/l)	8.9	3.2	12.1	87	300	892	
Fe, TR (µg/l)	8.9	3.2	12.1	170	1000	3308	
Pb, Dis (µg/l)	8.9	3.2	12.1	0	3.8	14	
Mn, Dis (µg/l)	8.9	3.2	12.1	120	156	256	
Mo, TR (µg/l)	8.9	3.2	12.1	0	160	605	
Hg, Tot (µg/l)	8.9	3.2	12.1	0	0.01	0.038	
Ni, Dis (µg/l)	8.9	3.2	12.1	0	71	268	
Se, Dis (µg/l)	8.9	3.2	12.1	0	4.6	17	
Ag, Dis (µg/l)	8.9	3.2	12.1	0	0.14	0.53	
Zn, Dis (µg/l)	8.9	3.2	12.1	200	190	190	1
Chloride (mg/l)	8.9	3.2	12.1	0	250	945	
Sulfate (mg/l)	8.9	3.2	12.1	84	250	712	
Nonylphenol (µg/l)	8.9	3.2	12.1	0	6.6	24	
Note 1: The existing water quality for this parameter exceeds the water quality standard; see the text for further discussion.							

Table A-7b Acute WQBELs							
<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>M₃</i>	<i>M₂</i>	<i>Notes</i>
Temp Daily Max (°C) June-Sept	8	3.2	11.2	NA	21.7	21.7	
Temp Daily Max (°C) Oct-May	8	3.2	11.2	NA	13.0	13	
E. coli (#/100 ml)	chronic X 2 = acute					936	
TRC (mg/l)	8	3.2	11.2	0	0.019	0.067	
Nitrate as N (mg/l)	8	3.2	11.2	0	10	35	
Al, TR (µg/l)	8	3.2	11.2	0	5690	19915	
As, Dis (µg/l)	8	3.2	11.2	6.6	340	1174	
Cd, Dis (µg/l)	8	3.2	11.2	0.7	2.4	6.7	
Cr+3, TR (µg/l)	8	3.2	11.2	0	50	175	
Cr+6, Dis (µg/l)	8	3.2	11.2	0	16	56	
Cu, Dis (µg/l)	8	3.2	11.2	0	19	67	
CN, Free (µg/l)	8	3.2	11.2	0	5	18	
Pb, Dis (µg/l)	8	3.2	11.2	0	97	340	
Mn, Dis (µg/l)	8	3.2	11.2	120	3379	11527	
Ni, Dis (µg/l)	8	3.2	11.2	0	641	2244	
Se, Dis (µg/l)	8	3.2	11.2	0	18.4	64	
Ag, Dis (µg/l)	8	3.2	11.2	0	3.8	13	
Zn, Dis (µg/l)	8	3.2	11.2	200	197	197	1
Nonylphenol (µg/l)	8	3.2	11.2	0	28	96	
Note 1: The existing water quality for this parameter exceeds the water quality standard; see the text for further discussion.							

Ammonia: The Ammonia Toxicity Model (AMMTOX) is a software program designed to project the downstream effects of ammonia and the ammonia assimilative capacities available to each discharger based on upstream water quality and effluent discharges. To develop data for the AMMTOX model, an in-stream water quality study should be conducted of the upstream receiving water conditions, particularly the pH and corresponding temperature, over a period of at least one year.

Temperature and corresponding pH data sets reflecting upstream ambient receiving water conditions were available for the San Miguel River in the previous WQA and used in this new WQA since the data were relatively new. Ammonia data were also available from the same data source. The data, reflecting a period of record from 2001 through December 2007, were used to establish the set-point and average headwater conditions in the AMMTOX model. Effluent pH and temperature data were also available from the Telluride Regional WWTF and were used to establish the average facility contributions in the AMMTOX model. Note that effluent pH and temperature were also taken from previous WQA.

The AMMTOX model may be calibrated for a number of variables in addition to the data discussed above. The values used for the other variables in the model are listed below:

- Stream velocity = $0.3Q^{0.4d}$
- Default ammonia loss rate = 6/day
- pH amplitude was assumed to be medium
- Default times for pH maximum, temperature maximum, and time of day of occurrence
- pH rebound was set at the default value of 0.2 su per mile
- Temperature rebound was set at the default value of 0.7 degrees C per mile.

The results of the ammonia analyses for the Telluride Regional WWTF are presented in Table A-8.

Table A-8 AMMTOX Results for the San Miguel River at the Telluride Regional WWTF <i>Design of 2.1 MGD (3.2 cfs)</i>		
<i>Month</i>	<i>Total Ammonia Chronic (mg/l)</i>	<i>Total Ammonia Acute (mg/l)</i>
January	13.5	22.5
February	13.5	25
March	18	35
April	27.5	29
May	55	58
June	63	63
July	34	56
August	27	46
September	19	31
October	19.5	33
November	16	30
December	14	24

VII. Antidegradation Evaluation

As set out in *The Basic Standards and Methodologies for Surface Water*, Section 31.8(2)(b), an antidegradation analysis is required except in cases where the receiving water is designated as “Use Protected.” Note that “Use Protected” waters are waters “that the Commission has determined do not warrant the special protection provided by the outstanding waters designation or the antidegradation review process” as set out in Section 31.8(2)(b). The antidegradation section of the regulation became effective in December 2000, and therefore antidegradation considerations are applicable to this WQA analysis.

According to the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins*, stream segment COGUSM03b is Undesignated. Thus, an antidegradation review is required for this segment if new or increased impacts are found to occur.

Introduction to the Antidegradation Process

The antidegradation process conducted as part of this water quality assessment is designed to determine if an antidegradation review is necessary and if necessary, to complete the required calculations to determine the limits that can be selected as the antidegradation-based effluent limit (ADBEL), absent further analyses that must be conducted by the facility.

As outlined in the *Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance* (AD Guidance), the first consideration of an antidegradation evaluation is to determine if new or increased impacts are expected to occur. This is determined by a comparison of the newly calculated WQBELs versus the existing permit limitations in place as of September 30, 2000, and is described in more detail in the analysis. Note that the AD Guidance refers to the permit limitations as of September 30, 2000 as the existing limits.

If a new or increased impact is found to occur, then the next step of the antidegradation process is to go through the significance determination tests. These tests include: 1) bioaccumulative toxic pollutant test; 2) temporary impacts test; 3) dilution test (100:1 dilution at low flow) and; 4) a concentration test.

As the determination of new or increased impacts, and the bioaccumulative and concentration significance determination tests require more extensive calculations, the Division will begin the antidegradation evaluation with the dilution and temporary impact significance determination tests. These two significance tests may exempt a facility from further AD review without the additional calculations.

Note that the antidegradation requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the antidegradation review; however, where there is only an acute standard, the acute standard should be used. The appropriate standards are used in the following antidegradation analysis.

Significance Tests for Temporary Impacts and Dilution

The ratio of the chronic (30E3) low flow to the design flow is 2.8:1, and is less than the 100:1 significance criteria. Therefore this facility is not exempt from an AD evaluation based on the dilution significance determination test, and the AD evaluation must continue.

For the determination of a new or increased impact and for the remaining significance determination tests, additional calculations are necessary. Therefore, at this point in the antidegradation evaluation, the Division will go back to the new or increased impacts test. If there is a new or increased impact, the last two significance tests will be evaluated.

New or Increased Impact and Non Impact Limitations (NILs)

To determine if there is a new or increased impact to the receiving water, a comparison of the new WQBEL concentrations and loadings versus the concentrations and loadings as of September 30, 2000, needs to occur. If either the new concentration or loading is greater than the September 2000

concentration or loading, then a new or increased impact is determined. If this is a new facility (commencement of discharge after September 30, 2000) it is automatically considered a new or increased impact.

Note that the AD Guidance document includes a step in the New or Increased Impact Test that calculates the Non-Impact Limit (NIL). The permittee may choose to retain a NIL if certain conditions are met, and therefore the AD evaluation for that parameter would be complete. As the NIL is typically greater than the ADBAC, and is therefore the chosen limit, the Division will typically conclude the AD evaluation after determining the NIL. Where the NILs are very stringent, or upon request of a permittee, the Division will calculate both the NIL and the AD limitation so that the limitations can be compared and the permittee can determine which of the two limits they would prefer, one which does not allow any increased impact (NIL), or the other which allows an insignificant impact (AD limit).

The non impact limit (NIL) is defined as the limit which results in no increased water quality impact (no increase in load or limit over the September 2000 load or limit). The NIL is calculated as the September 2000 loading, divided by the new design flow, and divided by a conversion factor of 8.34. If there is no change in design flow, then the NIL is equal to the September 2000 permit limitation.

If the facility was in place, but did not have a limitation for a particular parameter in the September 2000 permit, the Division may substitute an implicit limitation. Consistent with the First Update to the AD Guidance of April 2002, an implicit limit is determined based on the approach that specifies that the implicit limit is the maximum concentration of the effluent from October 1998 to September 2000, if such data is available. If this data is unavailable, the Division may substitute more recent representative data, if appropriate, on a case by case basis. Note that if there is a change in design flow, the implicit limit/loading is subject to recalculation based on the new design flow. For parameters that are undisclosed by the permittee, and unknown to the Division to be present, an implicit limitation may not be recognized.

This facility was in place as a discharger prior to September 30, 2000, and therefore the new or increased impacts test must be conducted. As the design flow of this facility has changed from 1.38 to 2.1 MGD, the equations for the NIL calculations are shown below.

For total residual chlorine, E.coli (based on fecal coliform) and total ammonia, the limitations as of September 2000 were used in the evaluation of new or increased impacts.

In accordance with the Division's practice regarding *E. coli*, an implicit limit for *E. coli* is determined as 0.32 times the permit limit for fecal coliform.

For any other parameter, data prior to 2000 were not available. Therefore data from 2001 through 2012 were determined to be adequate and were used to determine the implicit limitations.

For the parameters for which, there are no effluent data available and therefore, the Division will include monitoring requirements in the permit so that data can be collected in order to make such a determination of an implicit limit.

Calculation of Loadings for New or Increased Impact Test

The equations for the loading calculations are given below. Note that the AD requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the AD review; however, where there is only an acute standard, the acute standard should be used. Thus, the chronic low flows will be used later in this AD evaluation for all parameters with a chronic standard, and the acute low flows will be used for those parameters with only an acute standard.

$$\begin{aligned} \text{Previous permit load} &= M_{\text{permitted}} (\text{mg/l}) \times Q_{\text{permitted}} (\text{mgd}) \times 8.34 \\ \text{New WQBELs load} &= M_2 (\text{mg/l}) \times Q_2 (\text{mgd}) \times 8.34 \end{aligned}$$

Where,

$$\begin{aligned} M_{\text{permitted}} &= \text{September 2000 permit limit (or implicit limit) (mg/l)} \\ Q_{\text{permitted}} &= \text{design flow as of September 2000 (mgd)} \\ Q_2 &= \text{current design flow (same as used in the WQBEL calculations)} \\ M_2 &= \text{new WQBEL concentration (mg/l)} \\ 8.34 &= \text{unit conversion factor} \end{aligned}$$

Table A-9 shows the results of these calculations and the determination of a new or increased impact.

Calculation of Non-Impact Limitations

The design flow of this facility as of September 30, 2000 was 1.38 MGD. The new design flow of this facility is 2.1 MGD. To determine if new or increased impacts are to occur, the September 2000 permit concentrations need to be adjusted for this new design flow. The equations are shown below.

$$\begin{aligned} \text{September 2000 permit load} &= M_{\text{permitted}} \times Q_{\text{permitted}} \times 8.34 \\ \text{Non Impact Limit (NIL)} &= \text{September 2000 permitted load} \div \text{New Design Flow} \div 8.34 \end{aligned}$$

Where,

$$\begin{aligned} M_{\text{permitted}} &= \text{September 2000 permit limit or implicit limit (mg/l)} \\ Q_{\text{permitted}} &= \text{September 2000 design flow (mgd)} \\ Q_2 &= \text{new or current design flow (mgd)} \\ 8.34 &= \text{Unit conversion factor} \end{aligned}$$

Table A-9 shows the results of these calculations and the determination of a new or increased impact.

Table A-9 Determination of New or Increased Impacts						
<i>Pollutant</i>	<i>Sept 2000 Permit Limit</i>	<i>Sept 2000 Permit Load (lbs/day)</i>	<i>NIL</i>	<i>New WQBEL</i>	<i>New WQBEL Load (lbs/day)</i>	<i>New or Increased Impact</i>
E. coli (#/100 ml)	1690	19446	1110	468	8197	No
TRC (mg/l)	0.036	0.41	0.02	0.042	0.74	Yes
Nitrate as N (mg/l)	NA	NA	NA	35	613	Yes
NH ₃ , Tot (mg/l) Jan	4.3	49	2.83	13.5	236	Yes
NH ₃ , Tot (mg/l) Feb	4.3	49	2.83	13.5	236	Yes
NH ₃ , Tot (mg/l) Mar	4.3	49	2.83	18	315	Yes
NH ₃ , Tot (mg/l) Apr	4.3	49	2.83	27.5	482	Yes
NH ₃ , Tot (mg/l) May	4.2	48	2.76	55	963	Yes
NH ₃ , Tot (mg/l) Jun	4.2	48	2.76	63	1103	Yes
NH ₃ , Tot (mg/l) Jul	4.2	48	2.76	34	595	Yes
NH ₃ , Tot (mg/l) Aug	2.8	32	1.84	27	473	Yes
NH ₃ , Tot (mg/l) Sep	2.8	32	1.84	19	333	Yes
NH ₃ , Tot (mg/l) Oct	2.8	32	1.84	19.5	342	Yes
NH ₃ , Tot (mg/l) Nov	4.3	49	2.83	16	280	Yes
NH ₃ , Tot (mg/l) Dec	4.3	49	2.83	14	245	Yes
Al, TR (µg/l)	NA	NA	NA	3070	54	Yes
As, TR (µg/l)	NA	NA	5	0.076	0.0013	No
As, Dis (µg/l)	NA	NA	5	1174	21	Yes
Cd, Dis (µg/l)	NA	NA	12	0.56	0.0098	No
Cr, TR (µg/l)	NA	NA	NA	175	3.1	Yes
Cr+3, TR (µg/l)	NA	NA	NA	175	3.1	Yes
Cr+3, Dis (µg/l)	NA	NA	10	378	6.6	Yes
Cr+6, Dis (µg/l)	NA	NA	10	42	0.74	Yes
Cu, Dis (µg/l)	NA	NA	18	45	0.79	Yes
CN, Free (µg/l)	NA	NA	NA	18	0.32	Yes
Fe, Dis (µg/l)	NA	NA	240	892	16	Yes
Fe, TR (µg/l)	NA	NA	240	3308	58	Yes
Pb, Dis (µg/l)	NA	NA	6.2	14	0.25	Yes
Mn, Dis (µg/l)	NA	NA	51	256	4.5	Yes
Mo, TR (µg/l)	NA	NA	NA	605	11	Yes
Hg, Tot (µg/l)	0.4	0.0046	0.26	0.038	0.00067	No
Ni, Dis (µg/l)	NA	NA	7.8	268	4.7	Yes
Se, Dis (µg/l)	NA	NA	6	17	0.3	Yes
Ag, Dis (µg/l)	NA	NA	0.8	0.53	0.0093	No
Zn, Dis (µg/l)	NA	NA	194	190	3.3	No
Chloride (mg/l)	NA	NA	NA	945	16551	Yes
Sulfate (mg/l)	NA	NA	NA	712	12470	Yes
Nonylphenol (µg/l)	NA	NA	NA	24	0.42	Yes

As, TR was used for As, Dis; Fe, TR was used for Fe Dis; Ag, TR was used for Ag, Dis (April 2001); Hg Tot was Sept 1999 to August 2001

As shown in Table A-14, there are no new or increased impacts to the receiving stream based on the new WQBELS for E.coli, As TR, Cd Dis, Hg Tot, Ag Dis and Zn Dis, and for these parameters the AD evaluation is complete and the WQBELS are the final result of this WQA.

For those parameters with no NIL (Al, Cr, CN, Mo, chloride and sulfate), a monitoring requirement will be added to the permit.

For the rest of the parameters, there are new or increased impacts and in accordance with regulation, the permittee has the option of choosing either the NIL's or ADBAC's. Normally, the Division would assign the NILs as permit limitations, or prescribe monitoring to determine the appropriate implicit limitations as necessary, however, in this case, the NILs are relatively stringent and therefore the Division will automatically calculate the ADBACs for comparison.

The final two significance determination tests (bioaccumulative and concentration) need to be applied, to determine if AD limits are applicable. For the bioaccumulative test, the determination of the baseline water quality (BWQ), the baseline water quality loading (BWQload), the threshold load (TL) and the threshold load concentration (TL conc) needs to occur. For the concentration test, the BWQ, significant concentration thresholds (SCT) and antidegradation based average concentrations (ADBACs) need to be calculated. These calculations are explained in the following sections, and each significance determination test will be performed as the necessary calculations are complete. The AD low flow may also need to be calculated when determining the BWQ for an existing discharger (as of Sept 2000) when upstream water quality data are used.

Determination of Baseline Water Quality (BWQ)

The BWQ is the ambient condition of the water quality as of September 30, 2000. The BWQ defines the baseline low flow pollutant concentration, and for bioaccumulative toxic pollutants, the baseline load. The BWQ is to take into account the influence of the discharger if the discharge was in place prior to September 30, 2000. In such a case, data from a downstream location should be used to determine the BWQ. If only upstream data is available, then a mass balance equation may be applied, using the facilities effluent data to determine the BWQ. If the discharge was not present prior to September 30, 2000, then the influence of that discharge would not be taken into account in determining the BWQ. If the BWQ has already been determined in a previous WQA AD evaluation, it may not need to be recalculated as the BWQ is the water quality as of September 30, 2000, and therefore should not change unless additional data is obtained or the calculations were in error.

The BWQ concentrations were correctly determined for several potential pollutants of concern as part of a previous WQA (December 12, 2005). These are summarized in Table A-10.

Table A-10
BWQ Concentrations Based on Previous Determinations

<i>Pollutant</i>	<i>BWQ</i>
<i>E. coli</i> (#/100 ml)	8.0
TRC (mg/l)	0.0
Nitrate+Nitrite (mg/l)	0.0
As, TR (µg/l)	0.87
Cd, Dis (µg/l)	0.79
Cr+3, Dis (µg/l)	0.0
Cr+6, Dis (µg/l)	0.0
Cu, Dis (µg/l)	1.1
CN, Free (µg/l)	0.0
Fe, TR (µg/l)	170
Pb, Dis (µg/l)	0.87
Mn, Dis (µg/l)	123
Hg, Tot (µg/l)	0.0
Ni, Dis (µg/l)	0.0
Se, Dis (µg/l)	0.0
Ag, Dis (µg/l)	0.0
Zn, Dis (µg/l)	175
Chloride (mg/l)	5.9*
Sulfate (mg/l)	98*

Data from Riverwatch Station 99 (San Miguel at Pinon Bridge)

Bioaccumulative Significance Test

Parameter (mercury) associated with the bioaccumulative significance test will have WQBEL as permit limit based on Table A-9. Therefore, this section is therefore omitted.

Significant Concentration Threshold

The SCT is defined as the BWQ plus 15% of the baseline available increment (BAI), and is calculated by the following equation:

$$SCT = (0.15 \times BAI) + BWQ$$

The BAI is the concentration increment between the baseline water quality and the water quality standard, expressed by the term (WQS – BWQ). Substituting this into the SCT equation results in:

$$SCT = 0.15 \times (WQS - BWQ) + BWQ$$

Where,

WQS = Chronic standard or, in the absence of a chronic standard, the acute standard

BWQ = Value from Table A-10

The AMMTOX model is used to determine the SCTs for ammonia. Because the new ammonia standard is based on a function of the pH and temperature of the receiving stream, the WQS changes moving downstream from a discharge point. The BWQ and the SCT also change moving downstream. The AMMTOX model calculates these values for every tenth of a mile, for up to 20 miles. Therefore, it is impractical to show the SCTs for every part of the stream for all 12 months. These values are available in the AMMTOX model, if requested.

Determination of the Antidegradation Based Average Concentrations

Antidegradation based average concentrations (ADBACs) are determined for all parameters except ammonia, by using the mass-balance equation, and substituting the SCT in place of the water quality standard, as shown in the following equation:

$$ADBAC = \frac{SCT \times Q_3 - M_1 \times Q_1}{Q_2}$$

Where,

- Q_1 = Upstream low flow (1E3 or 30E3 based on either the chronic or acute standard)
- Q_2 = Current design capacity of the facility
- Q_3 = Downstream flow ($Q_1 + Q_2$)
- M_1 = Current ambient water quality concentration (From Section III)
- SCT = Significant concentration threshold

The ADBACs were calculated using the SCTs, and are set forth in Table A-11a.

ADBACs for total ammonia are calculated by substituting the SCT in place of the chronic standard in the AMMTOX model, which generates monthly ADBACs as shown in Table A-11b. However, it is the procedure of the Division to either impose the minimum of the calculated monthly ADBACs or determine average ADBACs for three groups. The ADBAC groups that were determined are summarized in Table A-11b.

Table A-11a SCTs and ADBACs						
<i>Pollutant</i>	<i>Q₁(cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁</i>	<i>SCT</i>	<i>ADBAC</i>
TRC (mg/l)	8.9	3.2	12.1	0	0.0017	0.0064
Nitrate as N (mg/l)	8	3.2	11.2	0	1.5	5.3
Al, TR (µg/l)	8.9	3.2	12.1	0	122	461
As, Dis (µg/l)	8	3.2	11.2	6.6	52	166
Cr+3, TR (µg/l)	8	3.2	11.2	0	7.5	26
Cr+3, Dis (µg/l)	8.9	3.2	12.1	0	15	57
Cr+6, Dis (µg/l)	8.9	3.2	12.1	0	1.7	6.4
Cu, Dis (µg/l)	8.9	3.2	12.1	0	2.7	10
CN, Free (µg/l)	8	3.2	11.2	0	0.75	2.6
Fe, Dis (µg/l)	8.9	3.2	12.1	87	190	476
Fe, TR (µg/l)	8.9	3.2	12.1	170	295	643
Pb, Dis (µg/l)	8.9	3.2	12.1	0	1.3	4.9
Mn, Dis (µg/l)	8.9	3.2	12.1	120	128	150
Mo, TR (µg/l)	8.9	3.2	12.1	0	24	91
Ni, Dis (µg/l)	8.9	3.2	12.1	0	11	42
Se, Dis (µg/l)	8.9	3.2	12.1	0	0.69	2.6
Chloride (mg/l)	8.9	3.2	12.1	0	43	163
Sulfate (mg/l)	8.9	3.2	12.1	84	121	224

Table A-11b ADBACs for Ammonia	
<i>Pollutant</i>	<i>Monthly ADBAC</i>
NH ₃ , Total (mg/l) Jan	2.3
NH ₃ , Total (mg/l) Feb	2.3
NH ₃ , Total (mg/l) Mar	2.7
NH ₃ , Total (mg/l) Apr	3.4
NH ₃ , Total (mg/l) May	8.3
NH ₃ , Total (mg/l) Jun	15
NH ₃ , Total (mg/l) Jul	5
NH ₃ , Total (mg/l) Aug	4
NH ₃ , Total (mg/l) Sep	2.7
NH ₃ , Total (mg/l) Oct	2.9
NH ₃ , Total (mg/l) Nov	2.5
NH ₃ , Total (mg/l) Dec	2.4

Concentration Significance Tests

The concentration significance determination test considers the cumulative impact of the discharges over the baseline condition. In order to be insignificant, the new or increased discharge may not increase the actual instream concentration by more than 15% of the available increment over the baseline condition. The insignificant level is the ADBAC calculated in Tables A-11a and A-11b above. If the new WQBEL concentration (or potentially the TL Conc for bioaccumulatives) is greater than the ADBAC, an AD limit would be applied. This comparison is shown in Tables A-12a and A-12b (for ammonia).

Table A-12a			
Concentration Significance Test			
<i>Pollutant</i>	<i>New WQBEL</i>	<i>ADBAC</i>	<i>Concentration Test Result</i>
TRC (mg/l)	0.042	0.0064	Significant
Nitrate as N (mg/l)	35	5.3	Significant
Al, TR (µg/l)	3070	461	Significant
As, Dis (µg/l)	1174	166	Significant
Cr+3, TR (µg/l)	175	26	Significant
Cr+3, Dis (µg/l)	378	57	Significant
Cr+6, Dis (µg/l)	42	6.4	Significant
Cu, Dis (µg/l)	45	10	Significant
CN, Free (µg/l)	18	2.6	Significant
Fe, Dis (µg/l)	892	476	Significant
Fe, TR (µg/l)	3308	643	Significant
Pb, Dis (µg/l)	14	4.9	Significant
Mn, Dis (µg/l)	256	150	Significant
Mo, TR (µg/l)	605	91	Significant
Ni, Dis (µg/l)	268	42	Significant
Se, Dis (µg/l)	17	2.6	Significant
Chloride (mg/l)	945	163	Significant
Sulfate (mg/l)	712	224	Significant

Table A-12b			
Concentration Significance Test for Ammonia			
<i>Pollutant</i>	<i>New WQBEL</i>	<i>ADBAC</i>	<i>Concentration Test Result</i>
NH3, Total (mg/l) Jan	13.5	2.3	Significant
NH3, Total (mg/l) Feb	13.5	2.3	Significant
NH3, Total (mg/l) Mar	18	2.7	Significant
NH3, Total (mg/l) Apr	27.5	3.4	Significant
NH3, Total (mg/l) May	55	8.3	Significant
NH3, Total (mg/l) Jun	63	15	Significant

NH3, Total (mg/l) Jul	34	5	Significant
NH3, Total (mg/l) Aug	27	4	Significant
NH3, Total (mg/l) Sep	19	2.7	Significant
NH3, Total (mg/l) Oct	19.5	2.9	Significant
NH3, Total (mg/l) Nov	16	2.5	Significant
NH3, Total (mg/l) Dec	14	2.4	Significant

For all parameters, the WQBELs are greater than the ADBACs and therefore, the concentration test results in a significance determination, and the antidegradation based effluent limitations (ADBELs) must be determined.

Antidegradation Based Effluent Limitations (ADBELs)

The ADBEL is defined as the potential limitation resulting from the AD evaluation, and may be either the ADBAC, the NIL, or may be based on the concentration associated with the threshold load concentration (for the bioaccumulative toxic pollutants). ADBACs, NILs and TLs have already been determined in the AD evaluation, and therefore to complete the evaluation, a final comparison of limitations needs to be completed.

Note that ADBACs and NILs are not applicable when the new WQBEL concentration (and loading as evaluated in the New and Increased Impacts Test) is less than the NIL concentration (and loading), or when the new WQBEL is less than the ADBAC.

Where an ADBAC or NIL applies, the permittee has the final choice between the two limitations. A NIL is applied as a 30-day average (and the acute WQBEL would also apply where applicable) while the ADBAC would be applied as a 2 year rolling average concentration. For the purposes of this WQA, the Division has made an attempt to determine whether the NIL or ADBAC will apply. The end results of this AD evaluation are in Table A-13, including any parameter that was previously exempted from further AD evaluation, with the final potential limitation identified (NIL, WQBEL or ADBAC).

Table A-13
Final Selection of WQBELs, NILs, and ADBACs

<i>Pollutant</i>	<i>NIL</i>	<i>New WQBEL</i>	<i>ADBAC</i>	<i>Chosen Limit</i>
E. coli (#/100 ml)	1110	468	NA	WQBEL
TRC (mg/l)	0.02	0.042	0.0064	NIL
Nitrate as N (mg/l)	NA	35	5.3	ADBAC
NH3 as N, Tot (mg/l) Jan	2.83	13.5	2.3	NIL
NH3 as N, Tot (mg/l) Feb	2.83	13.5	2.3	NIL
NH3 as N, Tot (mg/l) Mar	2.83	18	2.7	NIL
NH3 as N, Tot (mg/l) Apr	2.83	27.5	3.4	ADBAC
NH3 as N, Tot (mg/l) May	2.76	55	8.3	ADBAC
NH3 as N, Tot (mg/l) Jun	2.76	63	15	ADBAC
NH3 as N, Tot (mg/l) Jul	2.76	34	5	ADBAC
NH3 as N, Tot (mg/l) Aug	1.84	27	4	ADBAC
NH3 as N, Tot (mg/l) Sep	1.84	19	2.7	ADBAC
NH3 as N, Tot (mg/l) Oct	1.84	19.5	2.9	ADBAC
NH3 as N, Tot (mg/l) Nov	2.83	16	2.5	NIL
NH3 as N, Tot (mg/l) Dec	2.83	14	2.4	NIL
Al, TR (µg/l)	NA	3070	461	ADBAC
As, TR (µg/l)	5	0.076	NA	WQBEL
As, Dis (µg/l)	5	1174	166	ADBAC
Cd, Dis (µg/l)	12	0.56	NA	WQBEL
Cr, TR (µg/l)	NA	175	26	ADBAC
Cr+3, TR (µg/l)	NA	175	26	ADBAC
Cr+3, Dis (µg/l)	10	378	57	ADBAC
Cr+6, Dis (µg/l)	10	42	6.4	NIL
Cu, Dis (µg/l)	18	45	10	NIL
CN, Free (µg/l)	NA	18	2.6	ADBAC
Fe, Dis (µg/l)	240	892	476	ADBAC
Fe, TR (µg/l)	240	3308	643	ADBAC
Pb, Dis (µg/l)	6.2	14	4.9	NIL
Mn, Dis (µg/l)	51	256	150	ADBAC
Mo, TR (µg/l)	NA	605	91	ADBAC
Hg, Tot (µg/l)	0.26	0.038	NA	WQBEL
Ni, Dis (µg/l)	7.8	268	42	ADBAC
Se, Dis (µg/l)	6	17	2.6	NIL
Ag, Dis (µg/l)	0.8	0.53	NA	WQBEL
Zn, Dis (µg/l)	194	190	NA	WQBEL
Chloride (mg/l)	NA	945	163	ADBAC
Sulfate (mg/l)	NA	712	224	ADBAC

For some parameters, the NILs have been established for this facility. The NILs were selected as they are less stringent than the WQBELs and the ADBACs. However, the facility has the final choice between the NILs and ADBACs, and if the ADBAC is preferred, the permit writer should be contacted.

For several parameters, the ADBACs have been established for this facility. The ADBACs were selected as they are less stringent than the WQBELs and the NILs, or perhaps due to the application as a two-year rolling average. However, the facility has the final choice between the NILs and ADBACs, and if the ADBAC is preferred, the permit writer should be contacted.

Alternatives Analysis

If the permittee does not want to accept an effluent limitation that results in no increased impact (NIL) or in insignificant degradation (ADBAC), the applicant may conduct an alternatives analysis (AA). The AA examines alternatives that may result in no degradation or less degradation, and are economically, environmentally, and technologically reasonable. If the proposed activity is determined to be important economic or social development, a determination shall be made whether the degradation that would result from such regulated activity is necessary to accommodate that development. The result of an AA may be an alternate limitation between the ADBEL and the WQBEL, and therefore the ADBEL would not be applied. This option can be further explored with the Division. See Regulation 31.8 (3)(d), and the Antidegradation Guidance for more information regarding an alternatives analysis.

VIII. Technology Based Limitations

Federal Effluent Limitation Guidelines

The Federal Effluent Limitation Guidelines for domestic wastewater treatment facilities are the secondary treatment standards. These standards have been adopted into, and are applied out of, Regulation 62, the Regulations for Effluent Limitations.

Regulations for Effluent Limitations

Regulation No. 62, the Regulations for Effluent Limitations, includes effluent limitations that apply to all discharges of wastewater to State waters, with the exception of storm water and agricultural return flows. These regulations are applicable to the discharge from the proposed discharge.

According to Part 62.4(2) of the Regulations for Effluent Limitations "If the Commission has not so promulgated effluent limitation guidelines for any particular industry, but that industry is subject to effluent limitation guidelines promulgated by the United States Environmental Protection Agency pursuant to the Federal Water Pollution Control Act of 1972, the effluent from these industries shall be subject to the applicable EPA guidelines and shall not be subject to the effluent limitations of Regulation 62.4." Therefore, the limitation for oil and grease in Regulation 62.5 (10 mg/l) shall not apply to this discharge.

Table A-14 contains a summary of the applicable limitations for pollutants of concern at this facility.

Table A-14			
Regulation 62 Based Limitations			
<i>Parameter</i>	<i>30-Day Average</i>	<i>7-Day Average</i>	<i>Instantaneous Maximum</i>
BOD ₅	30 mg/l	45 mg/l	NA
BOD ₅ Percent Removal	85%	NA	NA
TSS, mechanical plant	30 mg/l	45 mg/l	NA
TSS Percent Removal	85%	NA	NA
Total Residual Chlorine	NA	NA	0.5 mg/l
pH	NA	NA	6.0-9.0 s.u.
Oil and Grease	NA	NA	10 mg/l

IX. References

Regulations:

The Basic Standards and Methodologies for Surface Water, Regulation 31, Colorado Department Public Health and Environment, Water Quality Control Commission, effective January 31, 2013.

Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins, Regulation No. 35, Colorado Department Public Health and Environment, Water Quality Control Commission, effective 3/30/2013

Regulations for Effluent Limitations, Regulation 62, CDPHE, WQCC, March 30, 2008.

Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation 93, Colorado Department Public Health and Environment, Water Quality Control Commission, effective March 30, 2013.

Policy and Guidance Documents:

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, December 2001.

Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department Public Health and Environment, Water Quality Control Division, April 23, 2002.

Rationale for Classifications, Standards and Designations of Segments of the Gunnison River, Colorado Department Public Health and Environment, Water Quality Control Division, effective 3/30/2013.

Policy Concerning Escherichia coli versus Fecal Coliform, CDPHE, WQCD, July 20, 2005.

Colorado Mixing Zone Implementation Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, effective April 2002.

Policy for Conducting Assessments for Implementation of Temperature Standards in Discharge

Permits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-23, effective July 3, 2008.

Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-19, effective May 2002.